

NATURE OF ACTION OF VARIOUS GENETIC MECHANISMS

TYPE C - INFUSION OF GENETIC MATERIAL

- NO IMPACT UNTIL AFTER 1ST GENERATION

RECESSIVE GENES FOR DESIRED TRAITS

RECESSIVE LETHALS

CONDITIONAL LETHALS

SEX RATIO DISTORTION

HYBRID STERILITY

NATURE OF ACTION OF VARIOUS GENETIC MECHANISMS

- TYPE A
- No infusion of genetic material
 - Impact does not extend past 1 generation

DOMINANT LETHAL MUTATIONS

COMPOUND CHROMOSOMES

CYTOPLASMIC INCOMPATIBILITY

HYBRID STERILITY

NATURE OF ACTION OF VARIOUS GENETIC MECHANISMS

TYPE A -No INFUSION OF GENETIC MATERIAL
-IMPACT DOES NOT EXTEND PAST 1 GENERATION

DOMINANT LETHAL MUTATIONS

COMPOUND CHROMOSOMES

CYTOPLASMIC INCOMPATIBILITY

HYBRID STERILITY

REQUIREMENTS FOR USING INSECTS IN AUTOCIDAL CONTROL

1. PRACTICAL PROCEDURES MUST BE DEVELOPED FOR REARING INSECTS
2. METHODS OF INDUCING STERILITY MUST BE AVAILABLE
3. REASONABLY ACCURATE ESTIMATES OF TARGET POPULATION DENSITY
4. STERILE INSECTS DISTRIBUTED IN RELATION WITH TARGET POPULATION
5. INFORMATION ON THE DYNAMICS OF TARGET POPULATION
6. RELEASED INSECTS MUST NOT BE UNDULY HAZARDOUS TO CROPS, ANIMALS,
OR MAN

FROM KNIPLING, 1979.

SITUATIONS WHERE THE AUTOCIDAL TECHNIQUE MIGHT BE USED

1. SUPPRESSING OR ELIMINATING WELL-ESTABLISHED POPULATIONS WHEN THEY EXIST NATURALLY AT LOW LEVELS AND ARE RESTRICTED IN DISTRIBUTION DURING SOME PERIOD IN NORMAL RECURRING POPULATION CYCLES.
2. ELIMINATING INCIPIENT POPULATIONS IN NEW AREAS.
3. PREVENTING THE ESTABLISHMENT OF POPULATIONS IN NEW AREAS.
4. MANAGE OR ELIMINATE WELL-ESTABLISHED POPULATIONS THAT ARE FIRST REDUCED BY OTHER METHODS.

FROM KNIPLING, 1979.

COMPONENTS OF SCREWORM ERADICATION PROGRAM

ADMINISTRATION

INSECT PRODUCTION

REARING

IRRADIATION

FIELD OPERATIONS

PACKAGING

DISTRIBUTION

SURVEILLANCE

QUARANTINE

INFORMATION

RESEARCH

COMPETITIVENESS
COMPETITIVENESS

COMPETITIVENESS

need vigorous, well adapted
insects

-strain

-behavior compatible

SITUATIONS WHERE THE AUTOCIDAL TECHNIQUE
MIGHT BE USED

1. SUPPRESSING OR ELIMINATING WELL-ESTABLISHED POPULATIONS WHEN THEY EXIST NATURALLY AT LOW LEVELS AND ARE RESTRICTED IN DISTRIBUTION DURING SOME PERIOD IN NORMAL RECURRING POPULATION CYCLES.

Screwworm
@ outset

2. ELIMINATING INCIPIENT POPULATIONS IN NEW AREAS. Tropical fruit flies

3. PREVENTING THE ESTABLISHMENT OF POPULATIONS IN NEW AREAS. mex fly
Pink bollworm

4. MANAGE OR ELIMINATE WELL-ESTABLISHED POPULATIONS THAT ARE FIRST REDUCED BY OTHER METHODS. Boll weevil

FROM KNIPLING, 1979.

Chemical control most efficient at hi density
Genetic control " " " lo density

REQUIREMENTS FOR USING INSECTS IN AUTOCIDAL CONTROL

1. PRACTICAL COMPONENTS OF SCREWORM ERADICATION PROGRAM

2. METHODS OF INDUCING STERILITY MUST BE AVAILABLE

3. REASONABLY ACCURATE ESTIMATION OF TARGET POPULATION DENSITY

4. STERILE INSECTS MUST BE RELEASED AND DISTRIBUTED IN RELATION WITH TARGET POPULATION

5. INFORMATION ON THE NORMAL RATE OF INCREASE OF TARGET POPULATION IS DESIRABLE

6. RELEASED INSECTS MUST NOT BE UNUSUALLY HAZARDOUS TO CROPS, ANIMALS, OR MAN

ADMINISTRATION

INSECT PRODUCTION

REARING - vigorous

IRRADIATION - sterility

FIELD OPERATIONS

PACKAGING -

DISTRIBUTION -

SURVEILLANCE - inspectors

QUARANTINE - prevent re-infestation

INFORMATION - educate people

RESEARCH - solve ~~real~~ problems
actual & anticipated

FROM KNIPLING, 1979.

REQUIREMENTS FOR USING INSECTS IN AUTOCIDAL CONTROL

1. PRACTICAL PROCEDURES MUST BE DEVELOPED FOR REARING INSECTS
- screwworm medias
- cattle grub
2. METHODS OF INDUCING STERILITY MUST BE AVAILABLE *- Problems w/ somatic tissue*
3. REASONABLY ACCURATE ESTIMATES OF TARGET POPULATION DENSITY
How many
4. STERILE INSECTS MUST BE RELEASED AND DISTRIBUTED IN RELATION WITH TARGET POPULATION
where
5. INFORMATION ON THE NORMAL RATE OF INCREASE OF TARGET POPULATION IS DESIRABLE
when to release
6. RELEASED INSECTS MUST NOT BE UNDULY HAZARDOUS TO CROPS, ANIMALS, OR MAN
mosq med fly *Genetic Sexing*

FROM KNIPLING, 1979.

NATURE OF ACTION OF VARIOUS GENETIC MECHANISMS

TYPE A - No INFUSION OF GENETIC MATERIAL

- IMPACT DOES NOT EXTEND PAST 1 GENERATION

DOMINANT LETHAL MUTATIONS

causes death of embryo
or other early stage

COMPOUND CHROMOSOMES

CYTOPLASMIC INCOMPATIBILITY

HYBRID STERILITY

intraspecific / gypsy moth
- strainal
interspecific
- Heliothis
Boophilus

NATURE OF ACTION OF VARIOUS GENETIC MECHANISMS

TYPE B -INFUSION OF GENETIC MATERIAL

-IMPACT BEGINS IN 1ST GENERATION AND EXTENDS BEYOND

INHERITED PARTIAL STERILITY

CHROMOSOME TRANSLOCATIONS

COMPOUND CHROMOSOMES

INHERITED HYBRID MALE STERILITY

CYTOPLASMIC INCOMPATIBILITY

NATURE OF ACTION OF VARIOUS GENETIC MECHANISMS

TYPE C - INFUSION OF GENETIC MATERIAL

- NO IMPACT UNTIL AFTER 1ST GENERATION

RECESSIVE GENES FOR DESIRED TRAITS

insecticide sus
NON-VECTOR TRAITS

RECESSIVE LETHALS

CONDITIONAL LETHALS - *non diapause*

SEX RATIO DISTORTION

HYBRID STERILITY

